

THE ATOM

los alamos
scientific laboratory
OF THE UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO

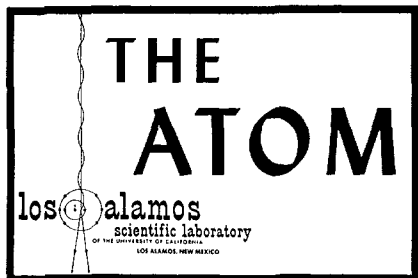
FEBRUARY
1964

LOS ALAMOS NATIONAL LABORATORY



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February, 1964

Volume 1 Number 2

Published monthly by the University of California,
Los Alamos Scientific Laboratory, Office of Public Relations,
P.O. Box 1663, Los Alamos, New Mexico, 87544.
Second Class Postage paid at Los Alamos, New Mexico.

Editor: David Sundberg

Photography: Bill Regan and Bill Jack Rodgers

Contributors: Members of the PUB staff

Office: D-417 Administration Building. Telephone: 7-5236.
Printed by The University of New Mexico Printing Plant, Albuquerque.

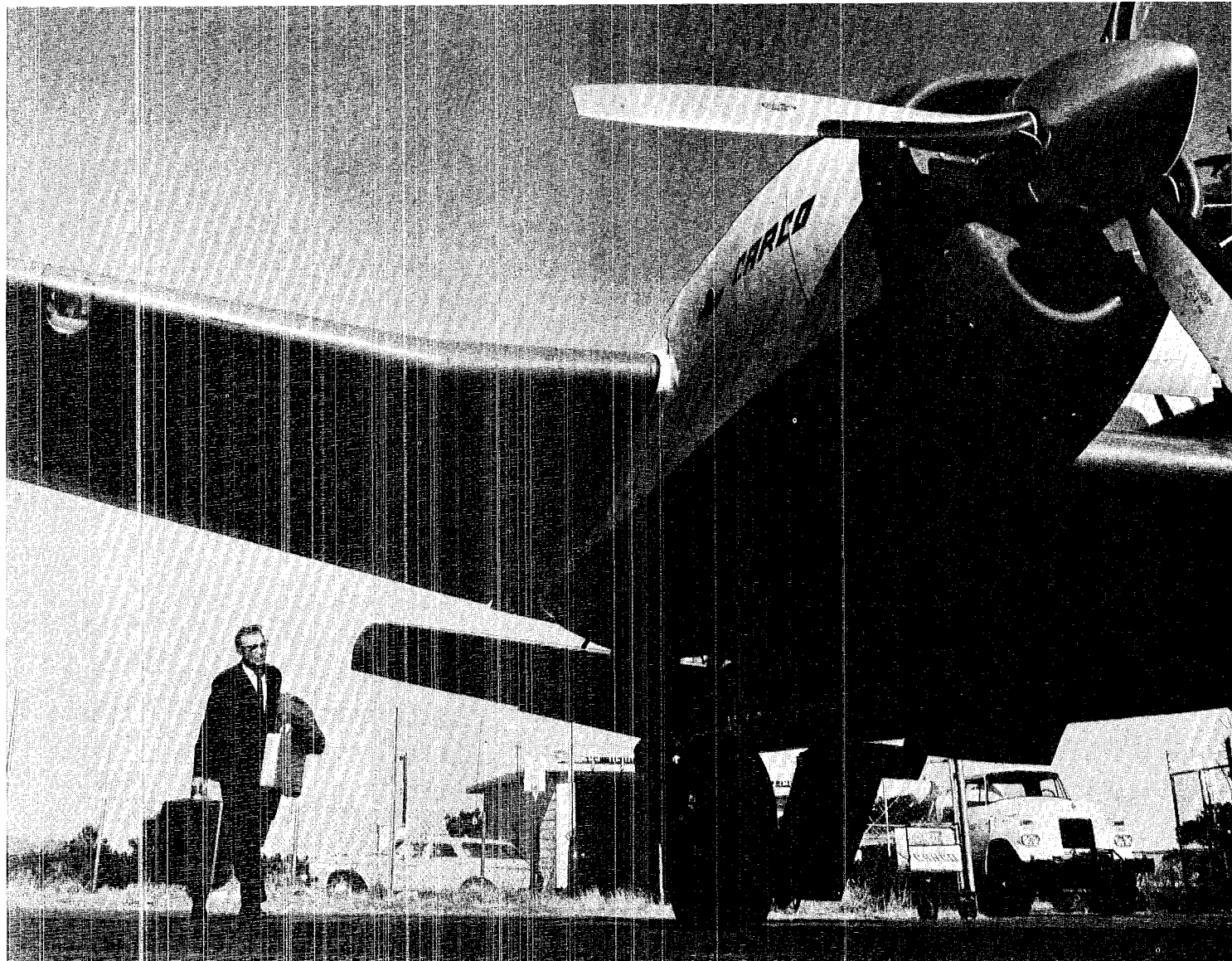
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ON THE COVER: Skiers on the slopes
of Pajarito Mountain in Bill Regan's
cover photograph create a pattern
which can exist only in winter. Other
winter patterns are shown on pages
12, 13, 14 and 15.

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About to depart on a trip to some of the nation's colleges and universities is LASL recruiter Robert Meier. Meier has traveled more than half a million miles in the past ten years, seeking new technical talent for the Laboratory.

THE SEARCH FOR BRAINS

RECRUITING SCIENTIFIC TALENT
REQUIRES PLANNING, SCHEDULING,
TRAVELING AND PLAIN HARD WORK

The nation's scientific and engineering brain power is in the enviable position of being able to pick and choose from among many job opportunities. Los Alamos Scientific Laboratory, like the rest of the nation's research institutions and industries, is keenly competing for this brain talent.

The Laboratory, early in its history, learned the importance of recruiting and was among the first to adopt some methods now in use throughout the United States.

Key man in LASL's recruiting efforts for the past ten years has

continued on next page

THE LABORATORY MUST ALSO BE ABLE TO P

continued from preceding page

been Robert C. Meier, assistant personnel director and head of the recruiting group. Meier has traveled nearly half a million miles and interviewed thousands of prospective Laboratory employees. His travels take him to the nation's major cities and to selected college and university campuses to talk with qualified applicants.

Every man in the Personnel Department also takes at least one recruiting trip a year, accompanied by a member of the Laboratory's technical staff who is familiar with the kind of work for which openings exist.

They visit some 30 colleges and universities each year, attend national meetings of professional societies and sometimes conduct "hotel recruiting" in various cities. The latter involves placing advertisements in the classified sections of local newspapers describing specific job opportunities. The ads give the recruiter's telephone number and interested persons are invited to call. Those who pass a brief telephone screening are invited to the hotel for interview.

LASL recruiting is not limited to personal interviews. Meier's office regularly mails out packets of literature and application blanks to college campuses not visited by LASL representatives. The Laboratory also places advertisements in leading technical journals of national circulation.

To maintain the high standards of its technical staff, the Laboratory, like the job-seeker, must be able to do some picking and choosing. Only about one out of ten recruited applicants is eventually hired. It's the recruiter's job to inform and encourage and do what else he can to interest the prospect, but not to offer him a job. That

decision is left up to the technical group where the vacancy exists.

Before any job offer is made, the applicant's records are studied at Los Alamos. If they are found acceptable, and if a group leader is interested, the applicant is brought to the Atomic City. For the prospective employee, the visit is both an opportunity to see Los Alamos and to talk with the people who may become his colleagues. For the interested group, the travel-paid interview is the last and most important step in the process of choosing a new member of the Laboratory.

Anticipating the Laboratory's needs far in advance is one of Meier's biggest problems. Recruiting activity is at a peak in the fall, directed toward students slated to receive degrees the following June. From initial campus interview to actual hiring covers several months.

"My job is mostly one of plan-

ning, timing and scheduling," Meier says. His office schedules trips to college campuses ten months to a year ahead of time. Each trip is planned to include visits to as many as four schools. "And then, about the time we get a trip lined up, maybe we get a wire from one of the colleges with the schedule-wrecking news that we'll have to change our dates there," he says.

Meier notes the development of campus placement offices in recent years has made the recruiter's job easier. Most schools now have such offices to serve both student and employer. Placement officers arrange the interviews and usually provide comfortable rooms in which to hold them. Not many years ago, Meier recalls, the recruiter was given little assistance in arranging his visit. Interviews were held in whatever room happened to be vacant on the campus at the moment. On one occasion

Omega Harkins, foreground, and Beverly Lee, both of PER-2, stuff envelopes with LASL recruiting literature and application forms for mailing to prospective new employees.



CK AND CHOOSE

that was a storage attic; on another, a boiler room.

Meier places much importance on the campus interview. During that half-hour, he points out, the prospect will probably form many opinions about Los Alamos. The interviewer must be able to describe the job and the community and correct any false notions the interviewee may have.

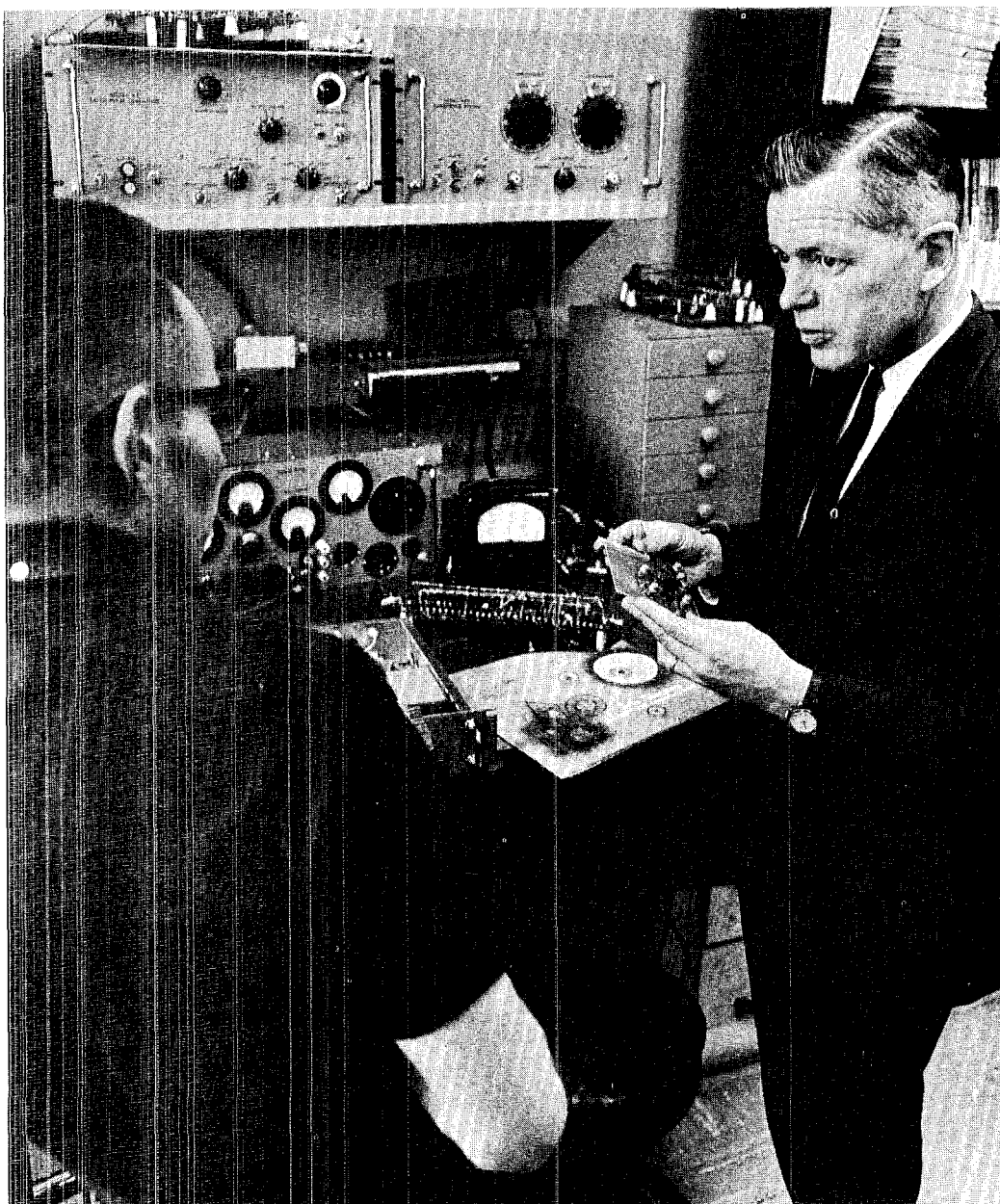
Misconceptions that Los Alamos lies in the midst of a desert probably cost the Laboratory many fine scientists in its early days. Correcting such impressions led to the use of color brochures in the early 1950's to show what the town really looks like. The desert image is less of a problem now but it still crops up on occasion.

Paradoxically, a few candidates have decided against Los Alamos after discovering it doesn't abound in sand and cactus.

Of necessity, LASL's recruiting program started in high gear. At the end of World War II, the bomb project a success, members of the technical staff were leaving in droves. Replacements had to be found, hired and put to work almost immediately to continue the Laboratory's work. Lacking experience, the recruiters' first efforts were often crude.

A case in point: The early advertising program. Advertisements, at first, offered little specific information and were placed in daily newspapers where they could be assured a large audience. Meier recalls the ads attracted "all sorts of people but rarely any qualified ones."

Letters of application came from farmers, morticians, servicemen eyeing Los Alamos as a duty station; cranks and screwballs sent in their special nuclear theories, sometimes offering them for free, sometimes wanting to sell them. Once, a too-compelling ad, imploring the



Members of the LASL technical staff assist Personnel Department recruiters conduct interviews. Here, Physicist Carroll Zabel, alternate K Division leader, talks with a Ph.D. candidate in a college laboratory.

reader to WRITE, drew the following letter:

Dear Sir:

I am too young to work at Los Alamos. I am only nine years old . . . so you can see I am too young to work at Los Alamos.

The letter was filed for future reference.

Now, laboratory advertisements are placed in professional and tech-

nical journals, where they draw fewer total responses but more from people the Laboratory can use.

Time and experience has brought revisions and refinements to LASL's recruiting methods. Call it salesmanship, science, or both—the measure of the success of LASL's recruiting is reflected in the growth and accomplishments of the Laboratory.

Short Subjects

Dr. Luis Alvarez, a wartime staff member at Los Alamos and now Professor of Physics at the University of California in Berkeley, has been awarded the National Medal of Science by President Lyndon Johnson. The award, one of the nation's highest for scientific achievement, cited Alvarez for his work in particle physics and contributions to national defense. Alvarez was with the Ordnance Division at LASL in 1944 and 1945. He was also responsible for many advancements in radar technology, including the Ground Controlled Approach landing system. Postwar research at the University has been devoted to the development of new types of accelerators and large bubble chambers.

Two LASL staff members — C. W. Christenson, group leader of H-7, and Charles Holley, alternate group leader of CMF-2—are bound for Vienna, Austria, this month, where they will work with the International Atomic Energy Agency of the United Nations. Christenson, who will be on leave from Los Alamos for a year, will do health, safety and contaminated waste disposal research. Holley will be gone two years. In Vienna he will do work dealing with the physical chemistry of nuclear materials and radioisotopes and the use of research reactors and other irradiation tools in chemical research.

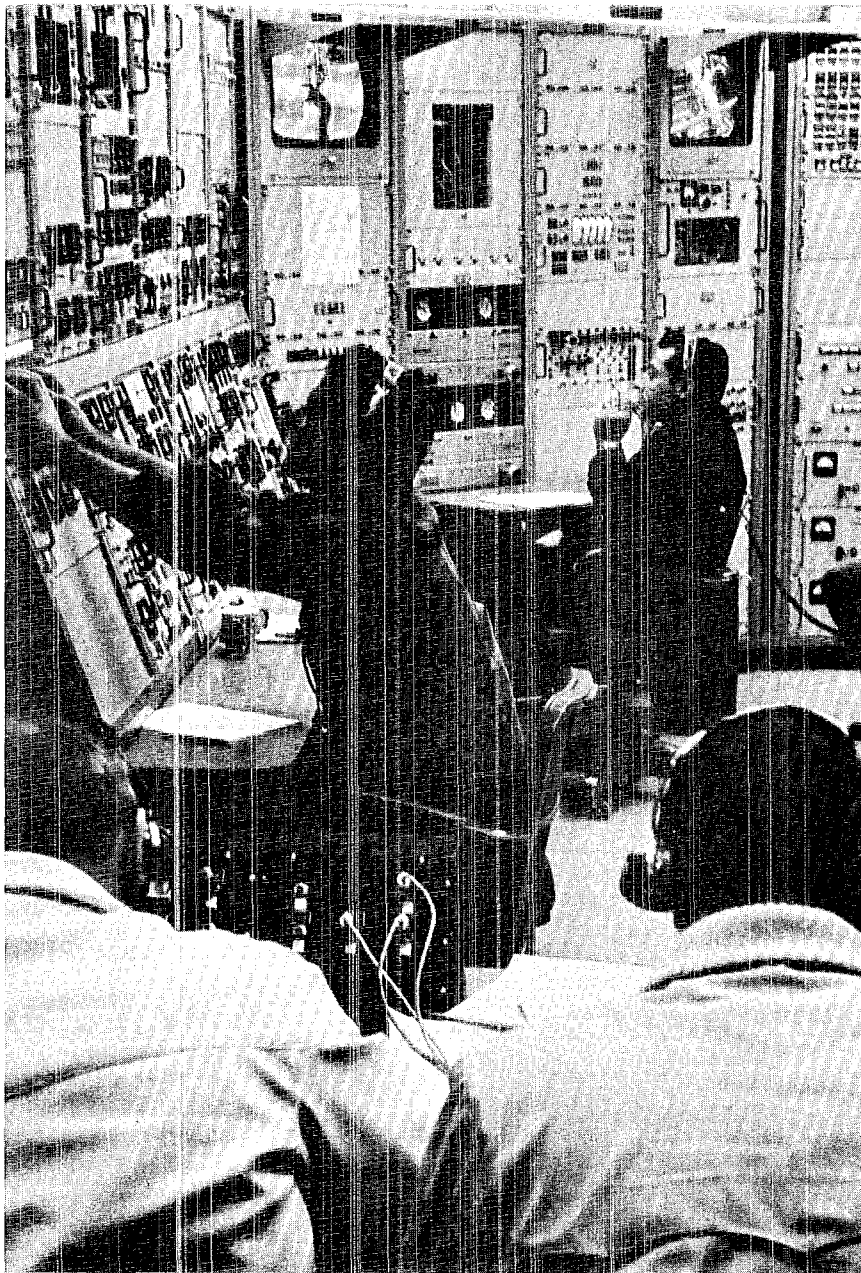
John W. Schulte, CMB-14 group leader, has been elected to the Executive Committee of the Remote Systems Technology Division of the American Nuclear Society. He will serve a three-year term.

For the time being it appears that the new community which had been proposed for an area near the Nuclear Rocket Development Station in Nevada has been put on the back of the stove. At least this is the feeling of AEC and SNPO officials in light of the revision in the Rover program. Eleven different sites had been under study as the location for the town.

Norman G. Wilson, K-1, and J. E. Deverall, N-5, will be members of the teaching staff at the University of Colorado's summer institute in "The Physical Horizons of Engineering." The institute, scheduled for July 6 through August 28, is designed for instructors of college level work in chemistry, physics and chemical or mechanical engineering and will be open to 50 students. Wilson will be serving his second summer as an instructor at the institute.

The reduction of plutonium and enriched uranium production promised by President Johnson in his State of the Union message last month is not expected to affect the supply of fissionable materials required for weapons research, development and testing, according to a statement from Kenner F. Hertford, manager of the AEC's Albuquerque Operations Office. "With respect to our weapons manufacturing plants, the modernization, retirement and fabrication of weapons will continue," Hertford said. "It is not expected that there will be any appreciable effect during Fiscal 1964 on weapons production plants, but as an adequate stockpile is reached there will be some adjustments."

KIWI SOUNDS OFF FOR SCIENCE



LASL J Division personnel man the control room for Test Cell "C" during the Acoustic test held at NRDS during January. Back to camera are Don Grosenick (left) and Donald Goetting, both of J-17. At the panel are William Hindle (left), J-5, and Joseph Hait, J-17. Remote television monitors all Kiwi reactor tests (note Kiwi on left TV screen).

A Kiwi B pressure vessel with nozzle was mated to Test Cell "C" at the Nuclear Rocket Development Station, Nevada, early in January and to the uneducated eye it looked as if a series of full-blown reactor tests were under way on January 9.

It was not a reactor test however, but rather a nozzle high flow acoustic experiment in which liquid hydrogen at about 100 pounds per square inch was pumped through the vessel and out the nozzle, first without pre-ignition and then pre-ignited. LASL scientists hope to establish a relationship between the flow rate of the hydrogen propellant and the acoustic energy imparted to the atmosphere. Herbert T. Knight, Assistant J Division Leader at NRDS, explained that the acoustic energy of the gas leaving the nozzle at high velocity has two major sound components—1) kinetic energy of the gas, and 2) combustion of the gas.

The acoustic test, with instrumentation conducted by Douglas Aircraft under NASA contract, was to establish whether the sound of the propellant at high nozzle velocities is richer in high or low frequencies; and hopefully the information gleaned from the January 9 experiment can be extrapolated to larger reactors with higher nozzle velocities.

And why a nozzle high flow acoustic experiment? It is altogether possible that the sound level of larger reactors can be damaging to construction materials, so the information from the experiment will be used to properly design future Project Rover test facilities.

HISTORY AT YOUR FEET

A thousand years of human history lie at your feet when you hike the newly-restored Indian trail from the new Bandelier campground on Frijoles Mesa to the ancient shrine on the bluff overlooking the canyon and its ruins.

Only a little over a mile long, the trail takes off from the old quarry where the stone for the park headquarters and lodge was hacked out by the Civilian Conservation Corps in 1938. It winds around a couple of deep ravines, reaching the rim of Frijoles Canyon close above Ceremonial Cave (which you can't see from above). Then it follows the rim downstream to its terminus on a spectacular overlook 600 feet straight up from the valley floor. That's what the map says—it seems about twice that high.

When you look down the canyon, the great circular ruin of Tyuonyi is directly ahead and below you. To your left, the old mule trail used to bring in tourists and supplies before the road was built in 1933 is still visible. To your right, the old Alamo trail to Corral Hill and the Stone Lions slants up the vertical south wall.

Farther ahead lies the headquarters group of buildings, the lodge, museum, and visitor's center, the old campgrounds and picnic area, and appearing as a thread at this distance, the little river of the beans itself. The access highway winds out of the scene against the backdrop of the far Sangre de Cristos.

A hundred feet back from the lookout point at the end of the trail is the large and mysterious circle of stones called a shrine for lack of a better name. Whatever it

was built for, it is obviously man-made, and ancient. Roughly squared stones, covered with lichens, are heaped to a height of four feet in a circle 15 or 20 feet in diameter. From the scattered rocks that surround the circle, it would appear that the wall once was higher. There also is evidence of a floor, although the site has not yet been excavated. Formerly accessible only by a terrifying hand-and-toe trail, the ruin has been spared the tender attentions of vandals.

Another and much smaller circle of stones is visible beside the trail, and others are to be found here and there in the Bandelier back country. They could have served as shelters, but more likely had some ceremonial significance.

Pottery sherds and chips of obsidian are sprinkled profusely around some of the stone circles, indicating they may have been used for hunting sites. Such a circle surrounds the stone lions of Yapasheni (sacred enclosure), the prehistoric panther effigies in the Bandelier back-of-beyond.

Also along the trail are numerous small ruins, appearing mostly as heaps of sand and cactus with a few stones sticking out. Pottery sherds in the vicinity (mostly Santa Fe black-on-white biscuit ware and some corrugated culinary ware) indicate a date of about 1250 AD for these so-called small-house ruins.

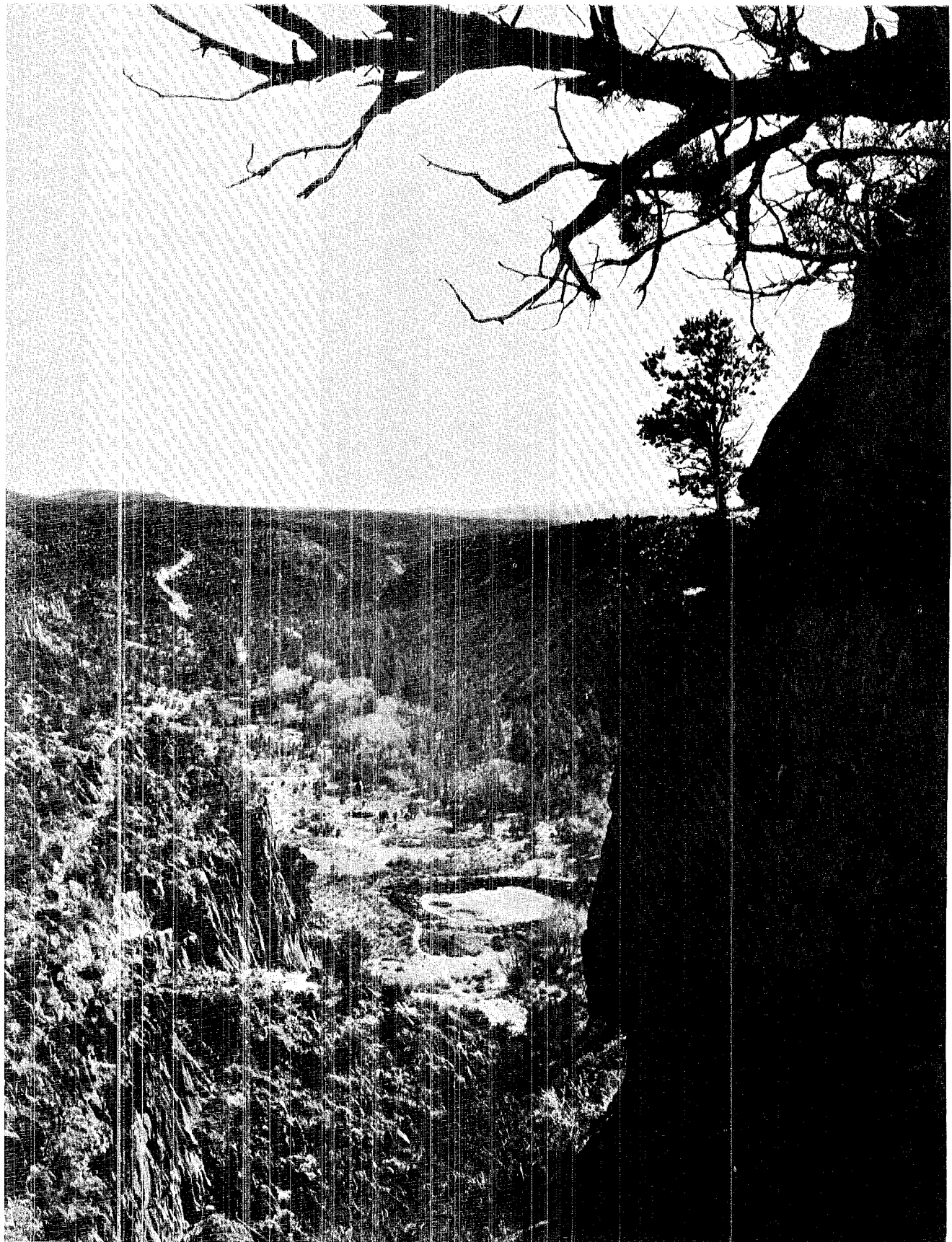
Most archeologists are convinced that a systematic and detailed study of the region, so far lacking, eventually will turn up positive evidence of earlier occupation, probably back to the late Basketmaker era circa 600 AD, and perhaps earlier. The typical pit-house ruins

of the Basketmaker culture have been found all around here, from Albuquerque to Navajo dam, and it seems improbable those early nomads would have passed up this fertile canyon and its environs.

The shrine trail has been reconstructed from an old Indian path as part of a current program of making the points of interest in the back country more accessible to hikers. Local labor, largely from Cochiti pueblo and elsewhere in Sandoval county, has been employed in the project under the federal Accelerated Public Works Program. (Other trails will be described in later issues of *The Atom*.)

The trail has already been adopted by the native mule deer, who like easy walking as well as tourists do. The loose dust of the surface is a study in tracks—deer, coyote, turkey and sometimes a wildcat or a cougar. Nearly dead level and on top of the mesa all the way, it should be open to foot travel almost any time except during a blizzard.

New and old ways into Frijoles canyon are visible from this vantage point near the ancient shrine that overlooks the great circular ruin of Tyuonyi (middle foreground). In the distance, the highway winding down from Frijoles mesa. At left, the old mule trail used before the highway was built. Headquarters buildings are hidden in the trees.



Proper handling of the dregs of radiochemistry is a problem that faces all atomic-age laboratories, one that grows steadily as research programs broaden.

One of LASL's answers is the Contaminated Liquid Waste Treatment plant on the road leading from Pajarito Road to Ten Site. Completed last year as the major portion of a \$2 million installation at TA-50, the plant treats waste solutions containing industrial and low-level radioactivity wastes from South Mesa and other technical sites.

The plant is the end point of a complex sewer system involving 23 thousand feet of mains and laterals and was built in the nick of time as relief for the overburdened plant at TA-45 on Canyon Road. TA-45, which was built as a pilot plant in 1950, will be razed after its last supplier, Old Sigma in TA-1, is shut down.

It should be pointed out that TA-50 is not the community sewage treatment plant. Those facilities, which serve both the town and South Mesa, are in Pueblo Canyon off Trinity Drive and are operated by the Zia Company; a third plant, to treat sanitary sewage from Baranca Mesa, is under construction in Bayo Canyon.

In many ways, "hot sewage" is handled like ordinary waste; the plant has grit screens, flocculators and sludge tanks. But most treatment plants don't have to cope routinely with varying quantities of acid and alkali and radioactive freshets that come gurgling in from a nuclear experiment.

AEC regulations require that the plant's effluent—the purified liquid—be as free of radioactivity as water meeting Federal standards for drinking water.

To accomplish such purification against great odds demands unfailing techniques and use of materials on an industrial scale that are somewhat delicate even in a laboratory.

C. W. Christenson, who heads Health Division's H-7 group, is

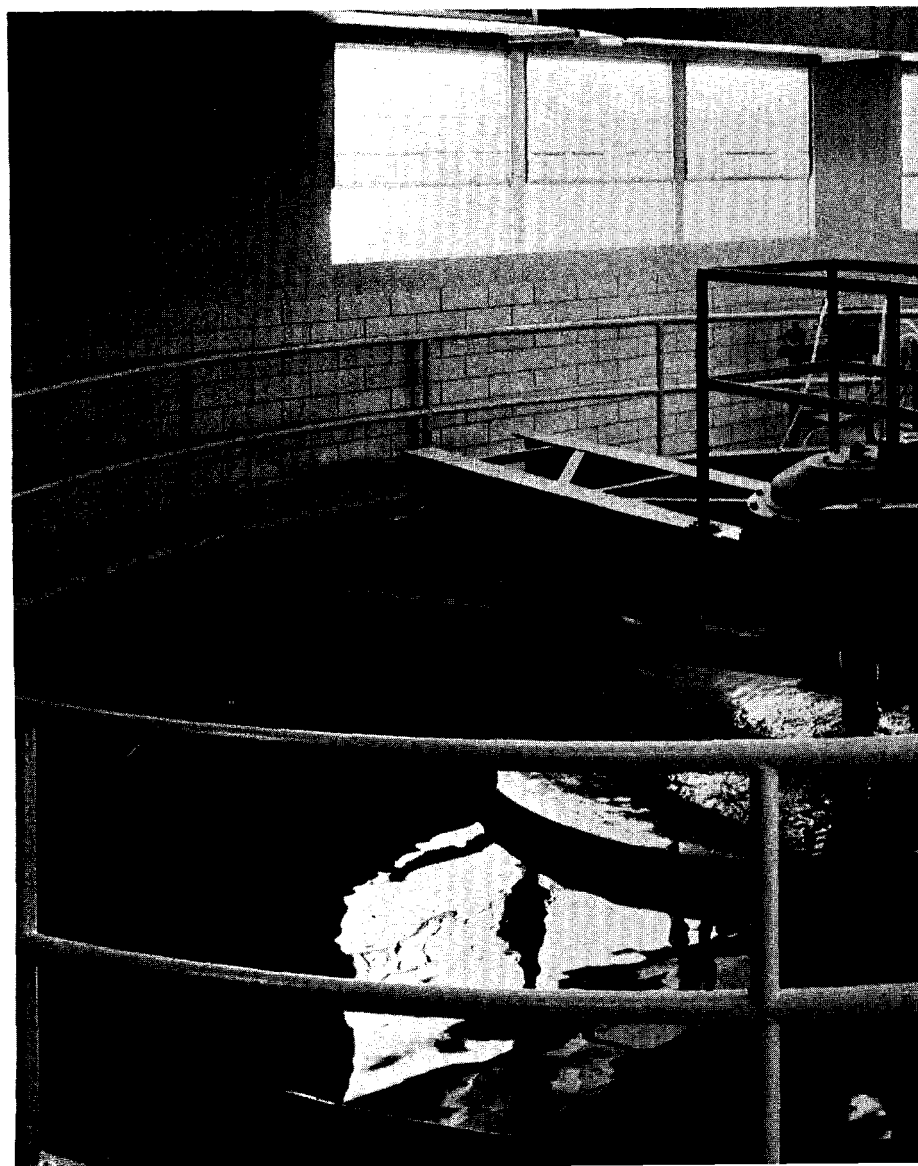
general manager and chief engineer for this plant, a smaller plant at DP Site, numerous collecting facilities at other sites, and for a research program to improve methods for treating low-level wastes and develop means for disposing of high-level discards. Christenson was

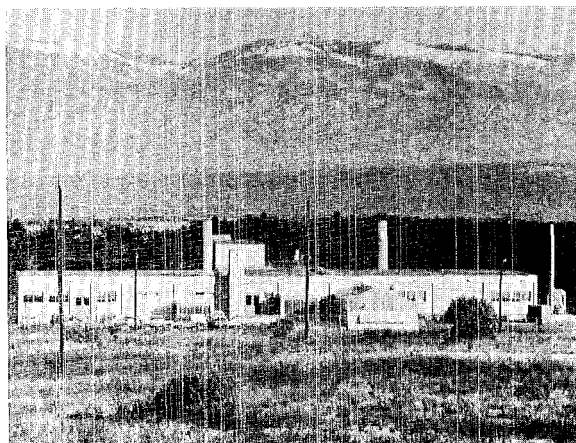
superintendent of water and sewage treatment at El Paso, Texas, before becoming an AEC industrial waste specialist in 1948 and joining LASL in 1955.

He echoes the opinion of H-Division Leader Dr. Thomas Shipman that TA-50 provides as com-

NEW PLANT COOLS THE HOT DREGS

Two giant tanks—called flocculator-clarifiers—are the heart of the contaminated liquid waste treatment plant at TA-50. The new plant purifies "hot sewage" from Los Alamos Scientific Laboratory's main technical area.





Contaminated Liquid Waste Treatment plant is in this building at TA-50.

OF LASL RESEARCH

BY EARL ZIMMERMAN

plete a decontamination to liquid waste as is performed anywhere.

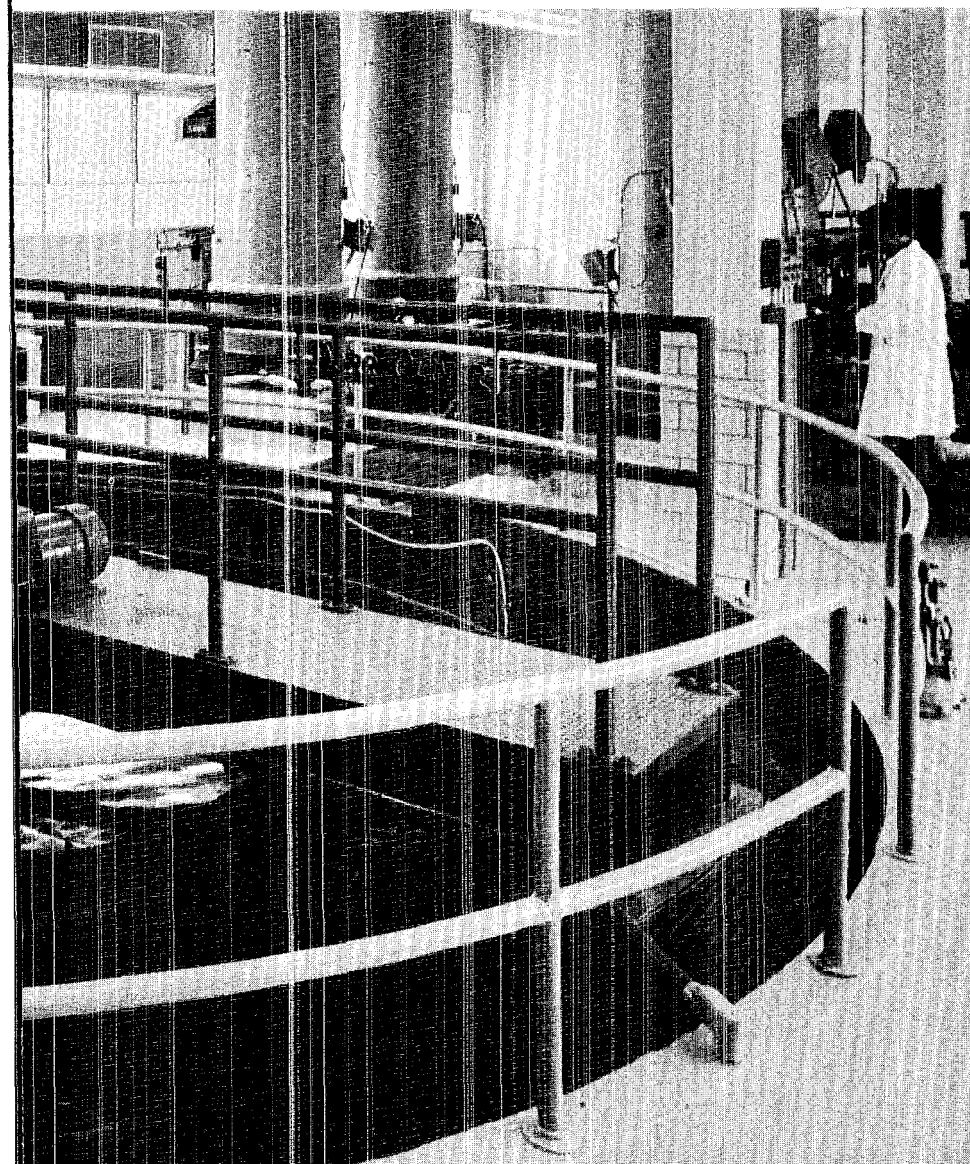
Basically, the operation of a waste treatment and purification system requires these steps: Collection, removal of insolubles, purification of the remaining liquid, and discharge and disposal. The presence of radioactivity doesn't alter these steps, it just requires special thoroughness.

The "acid sewer system," as the collection network is officially known, was part of the design of a large number of technical area buildings. This separate network of vitrified clay, cast iron and stainless steel pipe links laboratory sinks and drains to a small building, SM-700, at the south end of the Los Alamos Canyon Bridge. Pumps in this "lift station" send the waste through a pressure main that extends to Pajarito Road, where gravity takes over for the last mile and a half to TA-50. A separate station pumps waste uphill to the plant from Ten Site.

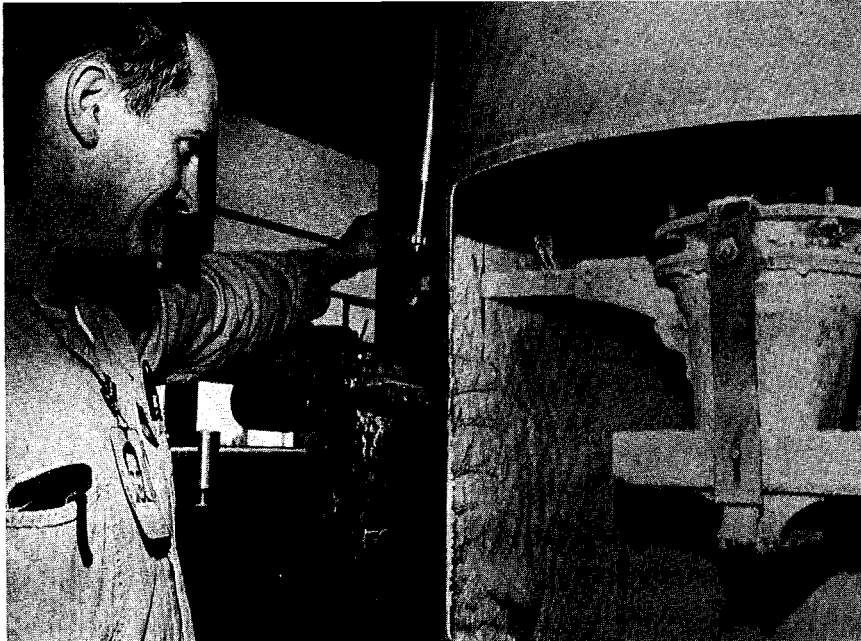
Collection ends in a concrete pit in the lower level of the plant building. A bar screen and grit chamber check the arrival of objects that had no business in the sewer to begin with—gloves, rags, coffee grounds and the like. Influent volume is tallied by a measuring gauge with recorder; the plant now operates at about 250 gallons a minute but is capable of several times that amount. An automatic dipper takes samples at least every two minutes; these are accumulated and analyzed twice daily to determine the quantity of radioactive and other materials in the waste.

Caustic soda (sodium hydroxide), which the plant buys in 3600-

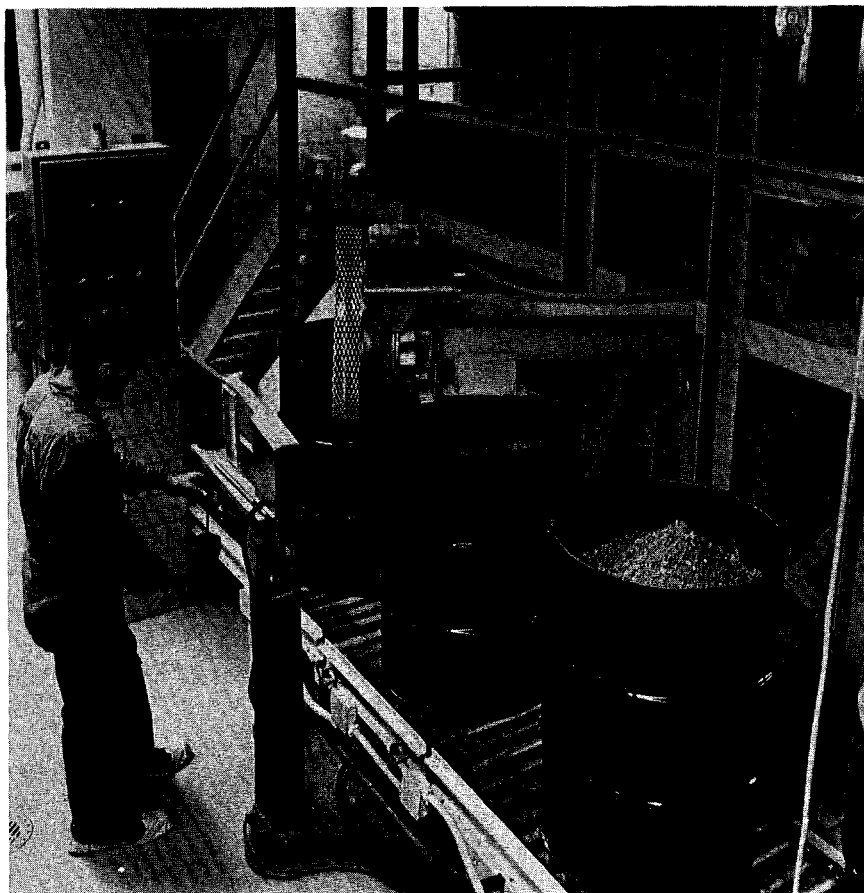
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Chief operator Neil Weeks checks the device that feeds precipitant chemicals to contaminated liquid.



LITTLE BESIDES DETERGENT SUDS REMAINS IN THE ONCI



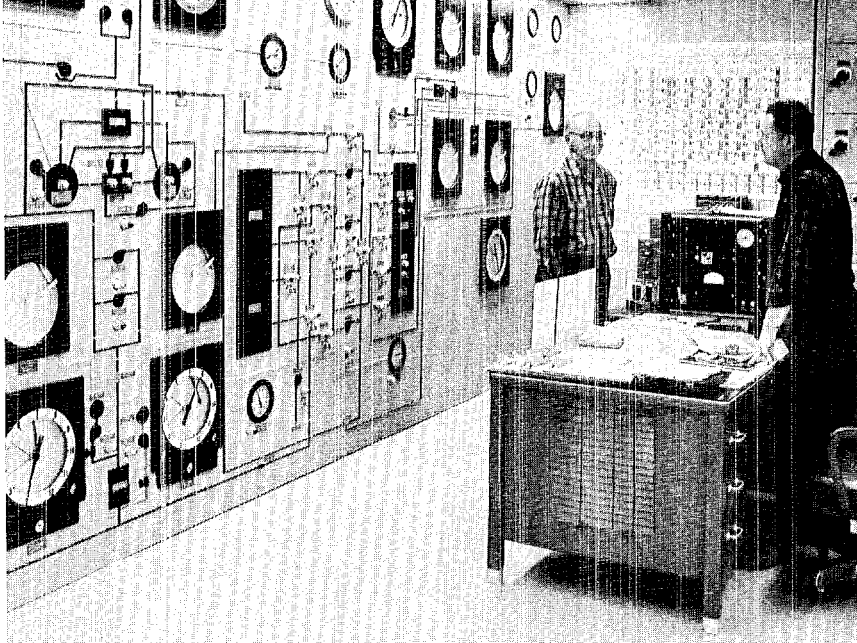
On the way to the burial pit are these barrels of contaminated sludge being weighed by Jim Simmons, operator in the treatment plant filter room.

continued from preceding page

gallon quantities, is added to neutralize acids. All laboratories have been asked to notify the plant immediately if something unusual is on the way. Christenson recalls an occasion at TA-45 when a quantity of cyanide solution from one drain met up with acids from another. Sensitive noses and hasty opening of windows averted a possible tragedy when the fuming mixture reached the plant.

Two great cisterns outside the building permit the holding of "problem" waste, if necessary. These tanks, of 75,000 and 25,000 gallons capacity, are also used for weekend storage when the plant is on five-day operation.

Inside the main building are the flocculator-clarifiers, two huge concrete tanks separated by chemical mixing devices. As the waste is brought in, precipitant chemicals—usually ferric sulfate and lime—are fed automatically from bins overhead. The precipitate falls to the bottom of the settling basins and is drawn off and sent to a filter room for water removal. A rubber paddle



H-7 Group Leader C. W. Christenson (left) and Lud Emility, leader of the group's Engineering Section, discuss TA-50 operation as it is outlined on this master control panel.

Chemist Elgin Rex takes sample of plant influent for analysis.

HOT SEWAGE

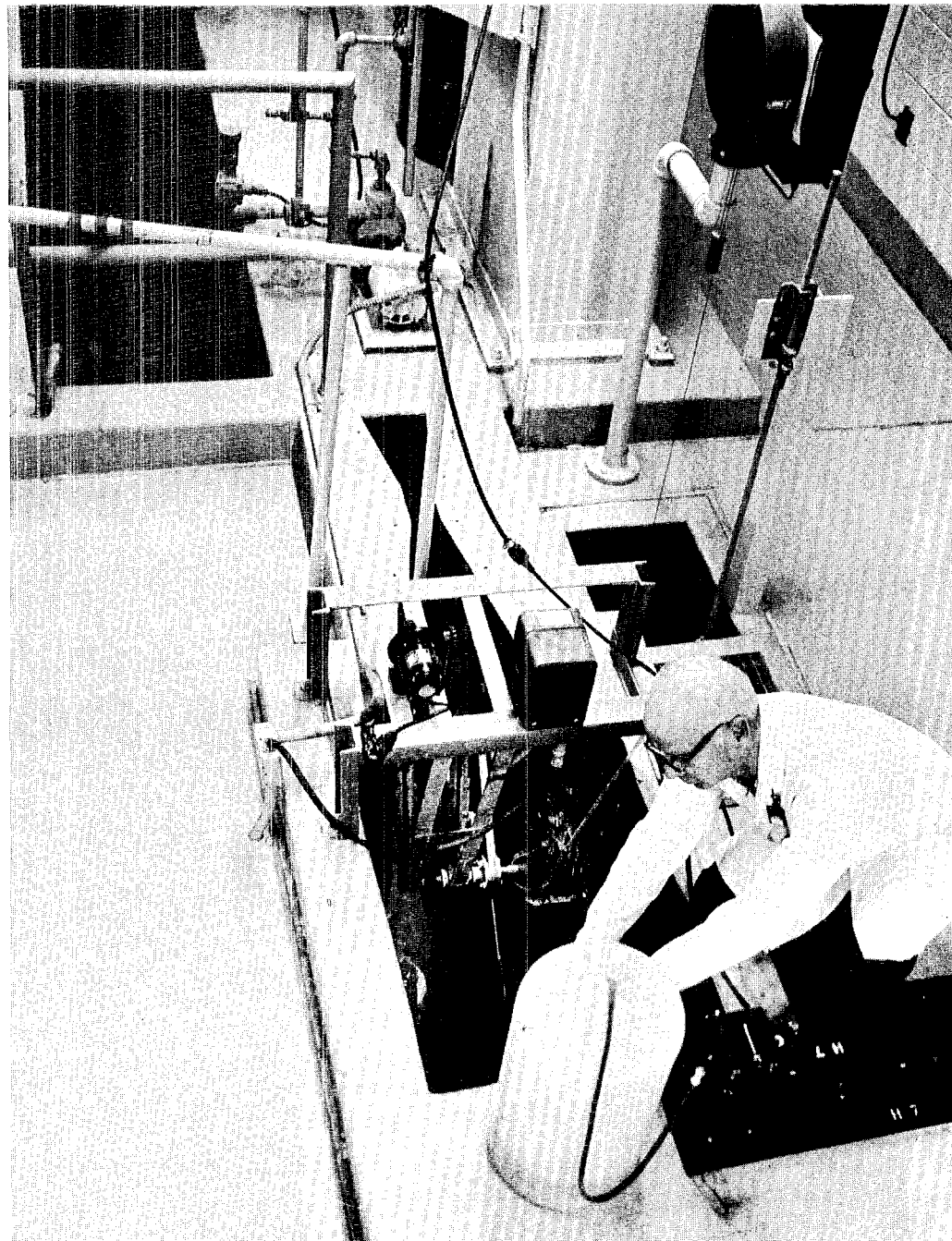
passes slowly across the surface to remove oil and other scum.

That portion of the radioactivity in the waste that was in suspension or otherwise insoluble is carried off in the precipitate; this usually takes care of plutonium and some fission products.

In the filter room the sludge is pumped to a rotating drum coated with diatomaceous earth. A vacuum within pulls liquid through the earth filter, leaving the nearly dry sludge to be scraped off the drum and dropped to a screw-driven conveyor which deposits the sludge in barrels. The barrels are hauled away for burial in the Mesa del Buey disposal pit area above Lower Pajarito Road.

If the liquid still indicates radioactivity it is passed through ion exchange columns, where artificial resins pull out any remaining ions—usually strontium 90, cesium and other isotopes.

What's left of the once hot sewage now contains little that is more objectionable than detergent suds, which defy removal efforts, and dribbles away into the adjacent canyon.



Patterns of the

Slim shadow on a mountain top, pinned there by a ski pole.

Snowballs in a juniper's grasp.



Winter Season

Winter brings high gas bills and frozen radiators and expenses for chains and coats, galoshes and gloves. It brings colds and sinus, early darkness and dull confinement.

It is, frequently, quite miserable.

Yet winter's chief commodity is an entrancing magic known to none other of the seasons. It turns black to white and masks the drabness of a dormant landscape. It is white frosting for pink mesa-cakes.

Like it or not, who would deny the sorcery of snow?

Photographs by Bill Regan and Bill Jack Rodgers



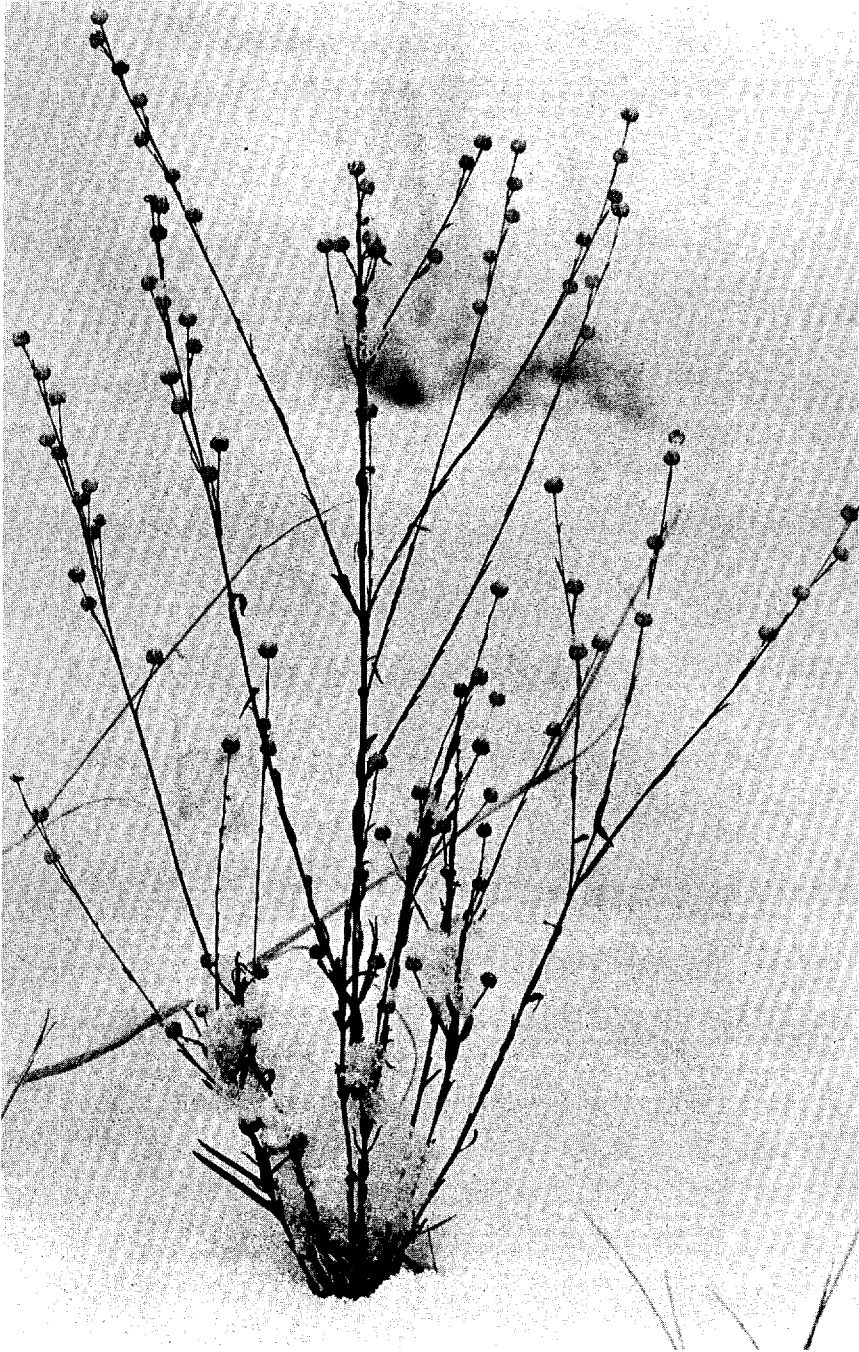
Falling in the forest, silently.

Though barren and vast, a playground still beckons.



Patterns . . .

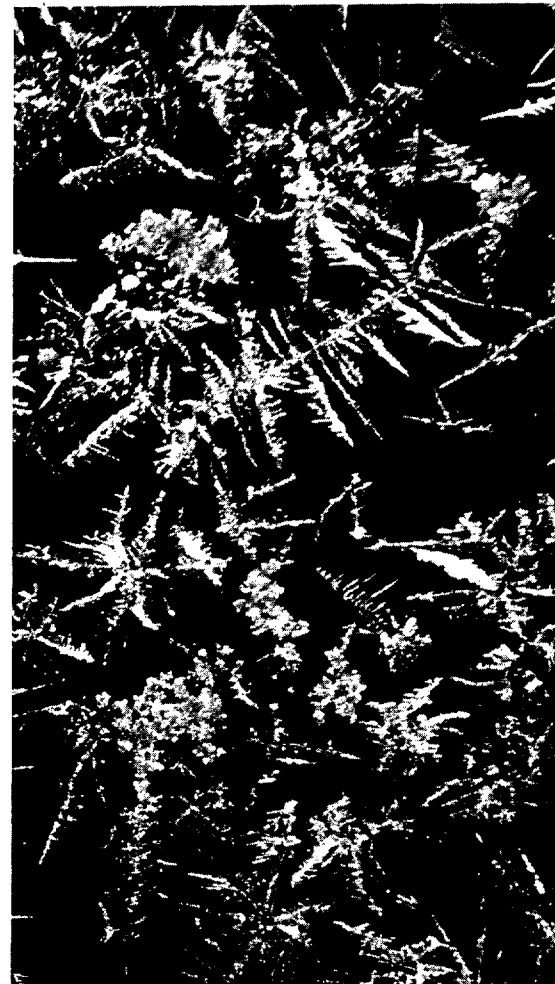
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Defying the inevitable, with dignity.



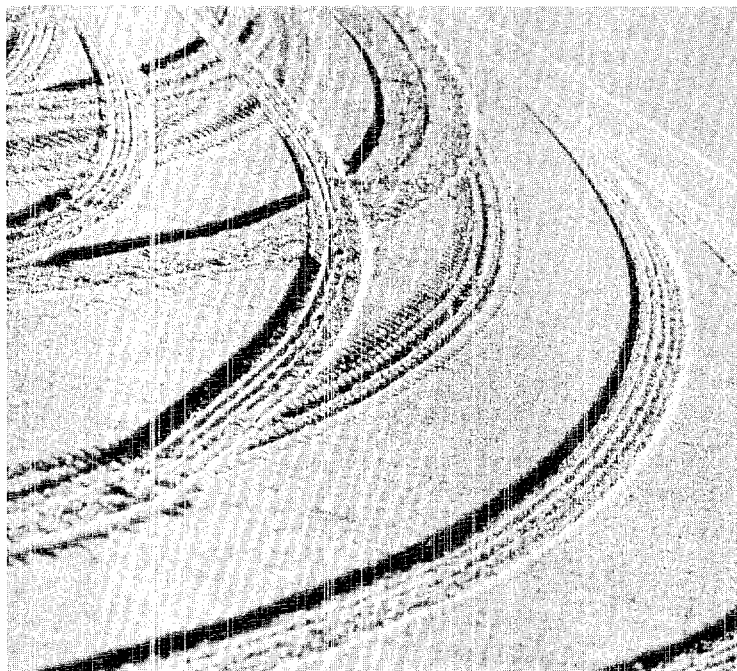
The infinite designs of flake and crystal.



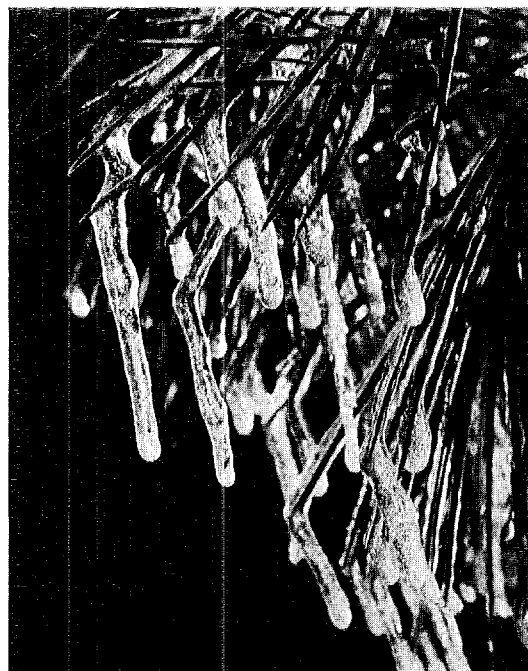


Zest in the air and a crunch underfoot.

Treading where there was no tread before.



Pine needles, ice-plated by a sudden freeze.

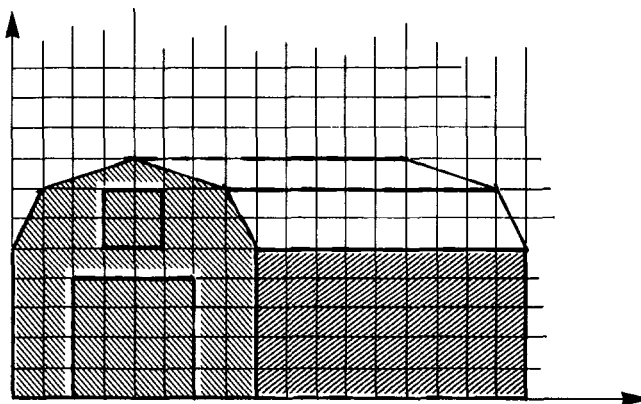


BROAD SIDE OF THE BARN

EVER WONDER WHERE SOME OF THOSE TECHNICAL TERMS COME FROM?

The birth and development of nuclear physics in the early 1940's brought a pressing need for a new vocabulary—a whole new scientific shorthand to describe the phenomena and the strange units of measurement encountered in the fast-growing field. Words, adopted on the spur of the moment by the imaginative men who needed them, became internationally accepted terms so that scientific lingo now includes such descriptive words as “babe” (20 kev) and “jerk” (10^{14} ergs to describe large units of energy, “shake” (10^{-8} seconds), and “barn”, (10^{-24}cm^2) a unit of measure for the probability, per nucleus, that a particular nuclear reaction will occur.

Origins of most of the colorful terms are lost in history, but LASL's Report Library has come across LAMS Report 523 entitled “Note on the Origin of the Term Barn”. It was written in 1944 by Marshall G. Holloway, an early M Division leader and director of Operation Crossroads, and C. P. Baker, a cyclotron specialist and member of G and M Divisions from 1943 to 1946. The report is published here in its entirety.



Sometime in December of 1942, the authors, being hungry and deprived temporarily of domestic cooking, were eating dinner in the cafeteria of the Union Building of Purdue University. With cigarette and coffee the conversation turned to the topic uppermost in their minds, namely cross sections. In the course of the conversation, it was lamented that there was no name for unit of cross sections of 10^{-24}cm^2 . It was natural to try to remedy this situation.

The tradition of naming a unit after some great man closely associated with the field ran into difficulties since no such person could be brought to mind. Failing in this, the names Oppenheimer and Bethe were tried since these men had sug-

gested and made possible the work on the problem with which the Purdue project was concerned. The “Oppenheimer” was discarded because of its length, although in retrospect an “Oppy” or “Oppie” would seem to be short enough.

The “Bethe” was thought to lend itself to confusion because of the widespread use of the Greek letter. Since John Manley was directing the work at Purdue, his name was tried but the “Manley” was thought to be too long. The “John” was considered, but was discarded because of the use of the term for purposes other than as the name of a person.

The rural background of one of the authors then led to the bridging of the gap between “John” and

“barn”. This immediately seemed good, and further it was pointed out that a cross section of 10^{-24}cm^2 for nuclear processes was really as big as a barn. Such was the birth of the “barn.”

To the best knowledge of the authors, the first public (if it may be called that) use of the barn was in Report LAMS 2 (June 28, 1943) in which the barn was defined as a cross section of $1 \times 10^{-24}\text{cm}^2$.

The authors would like to insist that the “barn” is spelled just that way, that no capital letter “b” is needed, and that the plural is “barns” with no letter “e” involved, and that the symbol be a small “b”. The meanings of “millibarn” and “kilobarn” are obvious.

THE CHRISTMAS TREES THAT KNOW NO SEASON

BY BILL JACK RODGERS

This is the story of 25,000 Christmas trees that found work after the holidays.

About ten years ago Dave Shaffer, CMB-14, read a magazine article deploring the number of Christmas trees wasted each year. The article noted that it takes a tree ten to fifteen years to grow large enough to become the decorative centerpiece of the holiday season, only to be burned or discarded after a couple of weeks' use.

Shaffer felt something could be done, at least in Los Alamos, to prevent the years of growth from

being entirely wasted. Shaffer, who is a member of the Izaak Walton League, proposed to his fellow members that Los Alamos' discarded Christmas trees might be collected and placed in the many arroyos around the community to help check soil erosion. He reasoned that if they were put in the right places, the trees could serve as nuclei for dams to slow the water which races through arroyos during heavy rains. If the water runoff could be slowed down, the erosive action should be slowed too.

Shaffer's proposal was heartily ac-

cepted by the League. Local Boy Scouts of America organizations agreed to help, as did Carl Freeman, Zia Company Parks director.

A plan for carrying out "Project Christmas Tree" was drawn and has remained much the same ever since. Cub Scouts gather trees from front lawns and pile them up at central pickup points. A fleet of trucks, driven by League members and manned by crews of Boy Scouts, take the trees to the selected areas. Mixed crews of Scouts and adults place them in arroyos.

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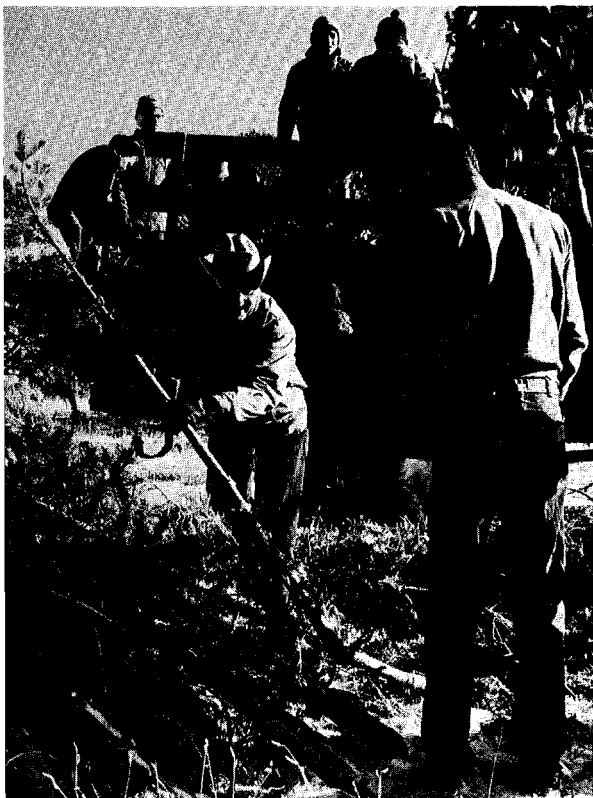
Riding in a pile of trees during "Operation Christmas Tree" are Scouts John Ruppert, Joe Michel, Randy Crabb and Dale Thomas.



"The Educational Benefits Alone Make This Program a Success"



Dave Shaffer holds a shock of grasses which have made their home in what was a barren wash three years ago.



AEC Conservationist Homer Pickens demonstrates how to use trees to build quail shelters for Boy Scout Charles Luders.

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As the years have passed, "Project Christmas Tree" has remained an annual event and has gained in manpower support. The Los Alamos Kiwanis Club joined the program four years ago. Another volunteer, AEC Conservationist Homer Pickens, also began lending his assistance. Pickens now researches new areas of erosion and selects the arroyos most in need of the tree dams.

Time and effort has paid off in visible results. North (Horse) Mesa is a fine example. An estimated 10,000 trees have been placed on that erosion-prone table top. Trees laid in wash areas have accumulated several layers of silt. Grasses and weeds have taken hold and now retard the rush of water from the spring melt-off and summer rains.

Present arroyos are filling and headwater sections show no new erosion development. Erosion has been stopped. More recently, work has been concentrated on sites in Pajarito and Rendija Canyons with the promise of similar success.

This year, some of the 3,000 trees collected after the holidays were used in a new experimental plan as a wildlife shelter. Pickens noted a small inhabitation of quail near the airport, though the high elevation of Los Alamos is extreme for the birds' survival. Protection against winter weather was provided for the quail by stacking trees Indian teepee style. If it works out, similar shelters will be built to protect other wildlife.

Aside from soil and wildlife conservation, the program boasts other accomplishments. "The educational benefits alone make this program a success," says Max Fowler, Izaak Walton League member and this year's project chairman. "The education the boys receive in the field

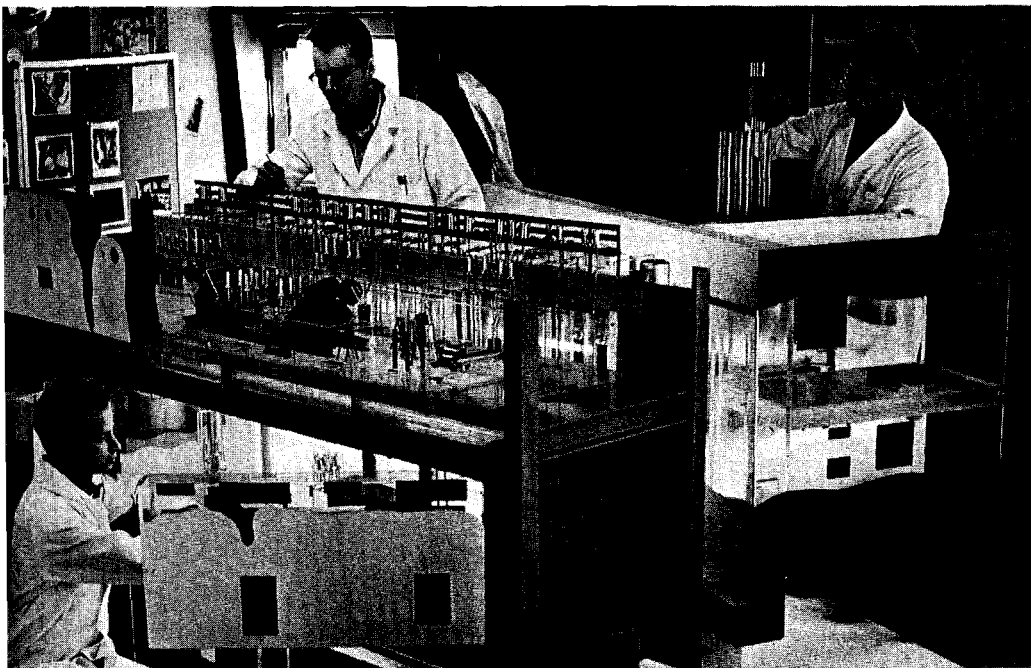


First, it's a matter of bringing trees to the pickup points, then the job is one of loading them on trucks for the trip to arroyos.



Here's where many of Los Alamos' discarded Christmas trees found their final resting place this year—in the bottom of this arroyo in Pajarito Canyon.

of conservation is one of the most important aspects of this project." "Project Christmas Tree" is spreading to other communities. Pojoaque and Española started similar programs this year and other cities in other states have expressed interest. Shaffer looks forward to a "Project Christmas Tree, U.S.A."



UHTREX

MAY BE LEAD TO REDUCED POWER COSTS

Three members of LASL's Engineering Department put finishing touches on a scale model of the Laboratory's UHTREX reactor facility. Left-to-right are Charles Frank, Ed Maxwell, and Harold Robinson.

It is safe to bet that the nation's nuclear power firms, always looking for a way to reduce their costs, are keeping an eye on UHTREX.

LASL's Ultra High Temperature Reactor Experiment (UHTREX) is one of the major efforts in the Laboratory's civilian reactor program which is aimed at new developments permitting major reductions in the cost of nuclear power.

Installation of the UHTREX reactor will begin following AEC acceptance of the reactor building, scheduled for completion on February 29. The reactor should go into operation about mid-1965.

John H. Russell, who heads the UHTREX group of LASL's power reactor division, explained that UHTREX is "uniquely capable of investigating the capabilities of highly simplified reactor fuels at high temperatures." He added that to the best of his knowledge there is no one else in the world building or even planning such a reactor.

LASL scientists hope, with the aid of UHTREX, to study fuel cycle concepts which greatly simplify the steps used in present reactors. UHTREX also offers the possibility of higher burnup of the

uranium fuel, or in laymen's terms greater fuel efficiency—like getting more miles to the gallon in an automobile.

Basic to the UHTREX study is the fuel element. UHTREX will be a high-temperature, helium-cooled reactor employing uranium impregnated fuel elements.

Russell said that UHTREX will have tremendous latitudes, for without turning off the reactor, one can carry on research by inserting various types of fuel elements into a rotating core. This core allows the reactor to be fueled continuously while at full power.

It has long been recognized that the significant chance for reduction in power reactor costs rests in the fuel cycle. Heavy costs are incurred in the fabrication of the fuel, cladding of the fuel, removal of the uranium from spent fuel elements, decontamination of the uranium, and re-fabrication of the fuel elements.

LASL scientists have a number of prime objectives in mind for UHTREX, including the study of the behavior of unclad, porous graphite fuel elements at various temperatures up to approximately

2,400 degrees F; the study of a coolant loop operating at high temperatures with an inert gas, such as helium, containing radioactive products from an operating reactor whose fuel elements are unclad; the study of the basic requirements and effectiveness of purifying a radioactive gas coolant; and the study of the low fuel reprocessing costs.

Contractor for the \$1,670,000 UHTREX building is Robert E. McKee General Contractor, Inc., of Santa Fe. The structure is approximately 130 feet by 85 feet at ground level. The underground portion of the building, where the reactor will be installed by Zia/LACI personnel under supervision of LASL engineers and scientists, extends to a depth of 50 feet. A shell about 35 feet high is above the ground, and this shell and pit will serve as a containment area in the unlikely event of the escape of radioactive gases from the reactor. The UHTREX reactor vessel is being fabricated by the Nooter Corporation of St. Louis, Missouri.

THE OTHER SIDE OF THE BOMB

NUCLEAR WEAPONS TESTING BENEFITS PURE SCIENCE RESEARCH

Nuclear weapons testing and pure science research may seem a bit incongruous, but 'tain't necessarily so.

Los Alamos scientists have, in fact, learned a great deal from experiments carried out simultaneously with weapons tests. An exploding bomb, after all, is just about the best source material there is for particle physics studies.

Three LASL staff members--Carson Mark, T Division Leader; George Cowan, J-11 Group Leader, and Sam Bame, Jr., of P-4--reported on some of LASL's "pure science" bomb-test benefits at an American Physical Society symposium in New York City, January 24.

There were outstanding achievements from the 1952 "Mike" shot, the first thermonuclear weapons test. These included the production and identification of two new elements, einsteinium and fermium, and the identification of a radioactive isotope of previously discovered californium. A similarity between the decay lifetime of the latter discovery and the luminosity period of exploding stars has led to generally-accepted theories on the formation of elements in the cosmos.

Attempts to duplicate the element production of "Mike" have been made with underground tests in Nevada. These have been promising but not successful as yet, mainly because the devices are about one-thousandth the size of the Eniwetok test.

Other experiments in Nevada have yielded valuable information in neutron spectroscopy. These utilized long vacuum pipes leading from the device to rapidly rotating

wheels made of uranium 235, making it possible to separate and study products of reactions at varying neutron energies.

High altitude weapons tests have posed some rather formidable physical obstacles to creating laboratory conditions but the tremendous amount of data available outweighs the discomforts and extra effort required.

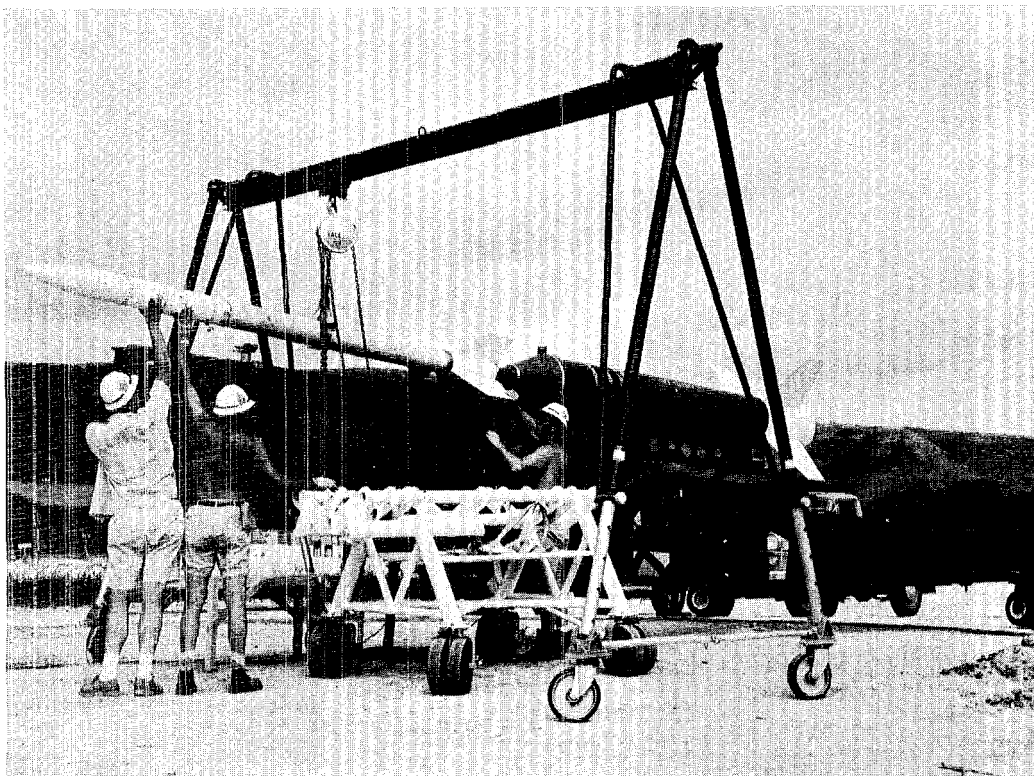
Use of radioactive "labels" on devices detonated outside the atmosphere has made it possible to amass new information on fallout,

on the mixing of the inaccessible mesosphere with the stratosphere, on the stability of the earth's magnetic fields, and has even helped man understand the magnificent aurora borealis.

LASL scientists had a record of 13 successes out of 13 tries in neutron energy spectra and time-of-flight research during the 1962 high altitude weapons tests in the Pacific. These experiments were conducted with the use of two-stage rockets that carried detecting instruments into an above-the-atmosphere position at just the same time a blast was occurring some 800 miles away.

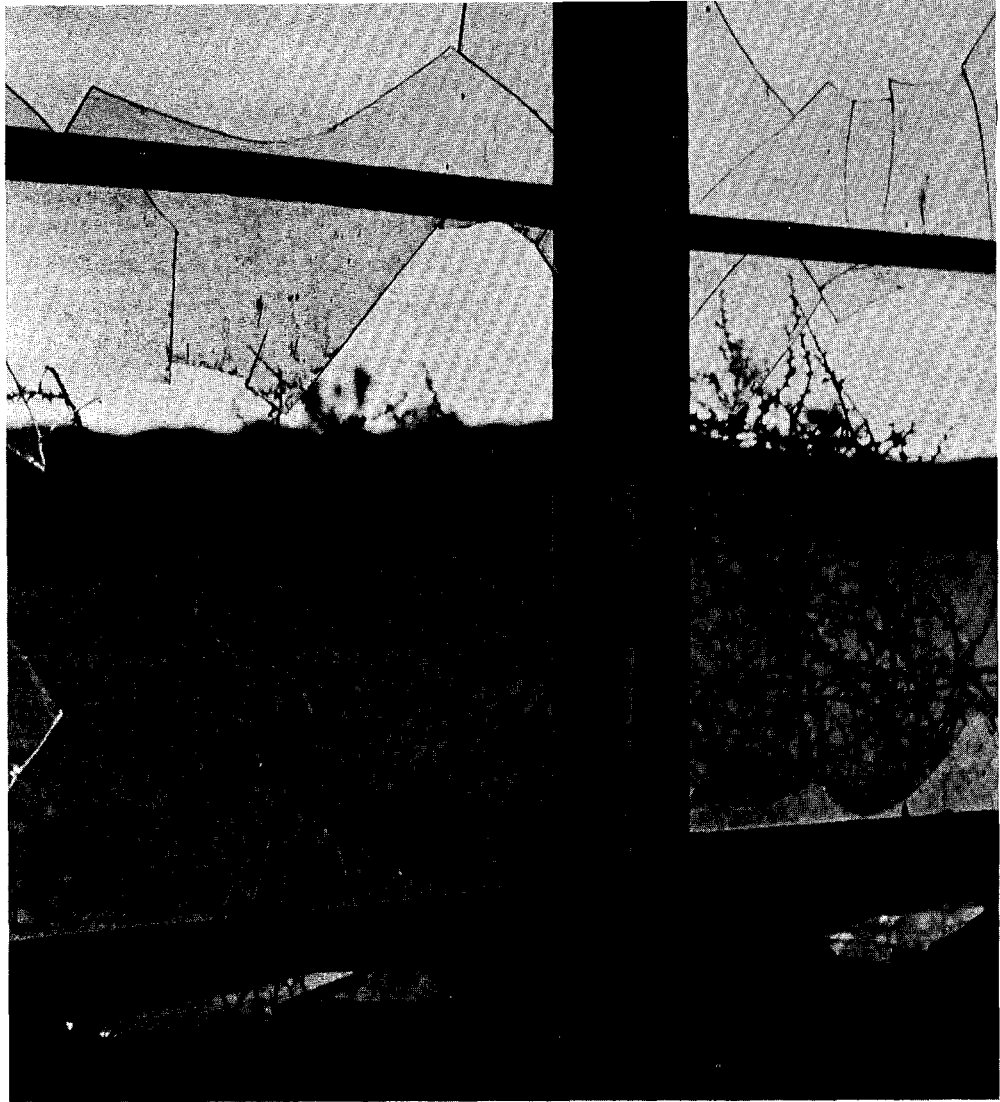
Data received in the span of a few seconds was radioed to earth and recorded for future analysis. To acquire the same sort of information on the ground would have required many days of work in laboratories boasting the absolute finest in research reactors and particle accelerators.

Instruments in the nose cone of this two-stage rocket lofted above Hawaii last year gathered valuable scientific data on neutrons emitted by a nuclear explosion 800 miles away.



NOBODY'S HOME TOWN

**THIS "COMMUNITY"
AT NEVADA TEST SITE
WAS BUILT
TO BE DESTROYED**



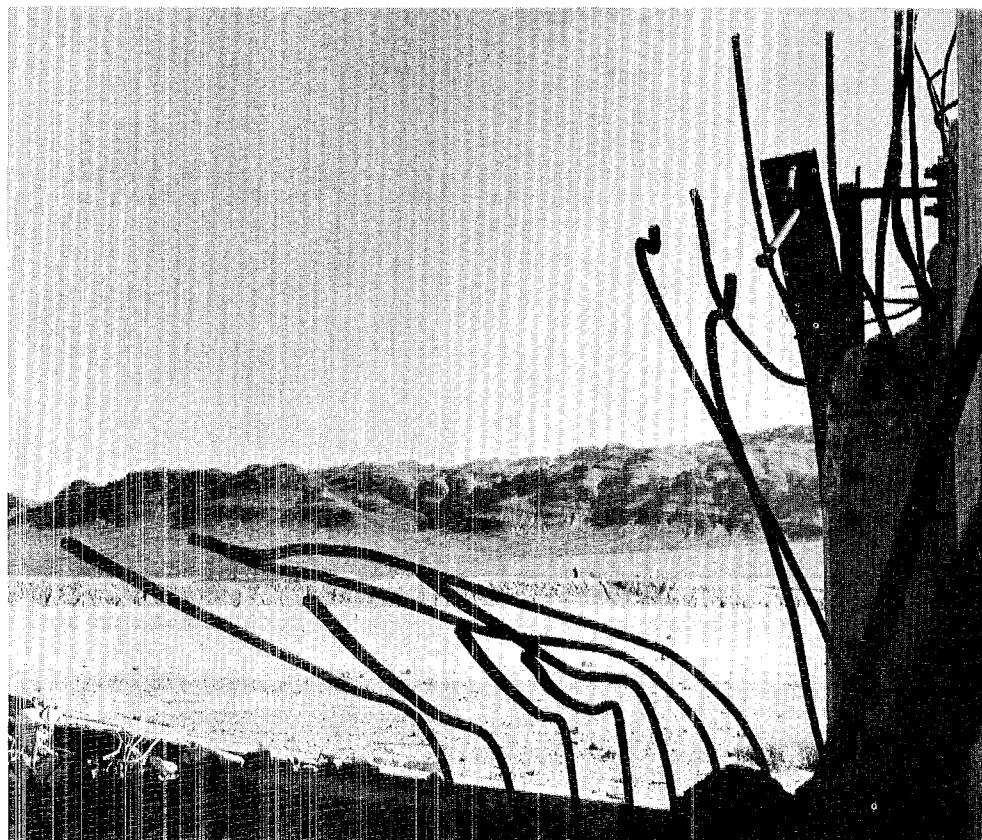
What happens to a bridge, an automobile, an airplane, or a home when struck by shock waves, heat and radiation from a nuclear explosion? These were questions that needed answers back when nuclear weapons were new. A lot of them were answered in effects tests conducted by the Defense Department and the Civil Defense Administration at the Nevada Test Site.

Now, ten years or so later, the answers are still grimly clear in the battered remains of houses, equipment and reinforced concrete structures still littering the desert. Unmarred by time in the gentle desert climate, a blown-out door swings on a single hinge, shattered glass in a bent window frame stares out on the seared expanse of ground zero. Crumbled concrete and twisted steel lie on the parched earth as unforgettable reminders of the power that was unleashed.

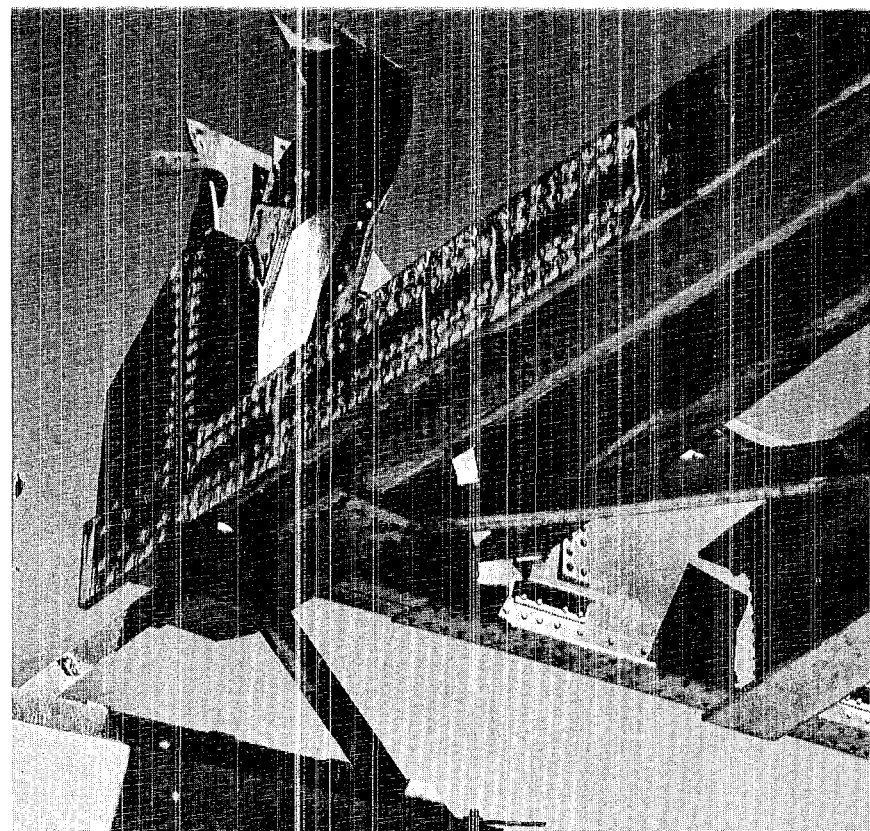
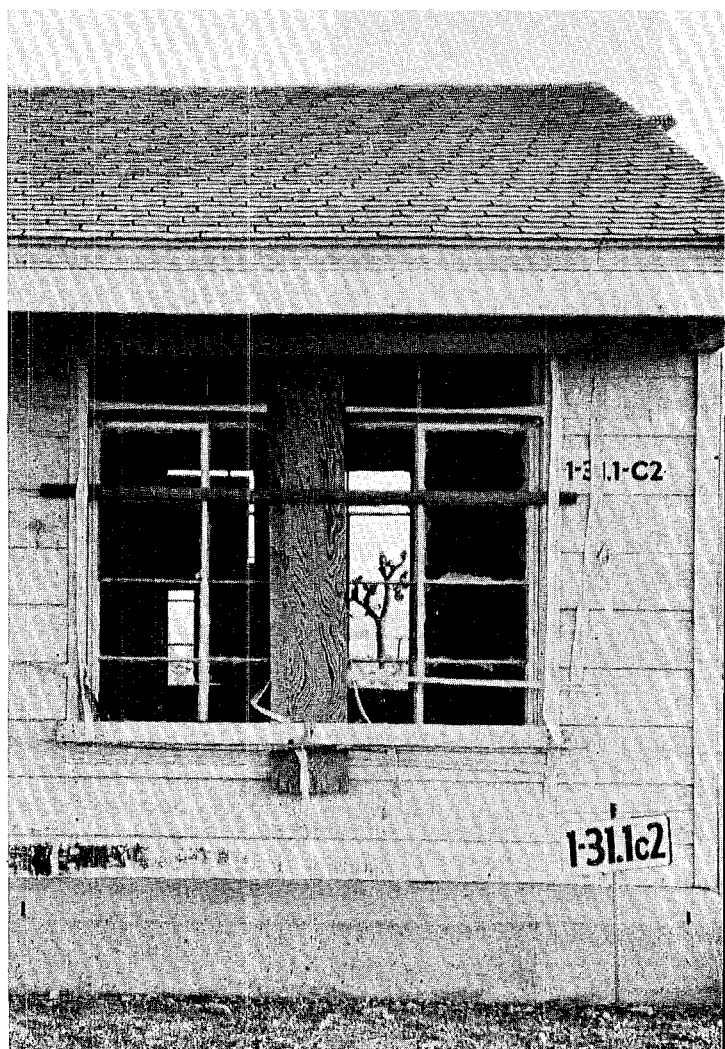
Tumbleweed is the bleak product of a window box outside a Yucca Flats house built for 1955 Civil Defense tests at Nevada Test Site.

Little remains of a steel and concrete bridge built at Frenchman's Flat for the 1953 Defense Department effects tests of nuclear weapons.

Effects test in Upshot-Knot-hole Operation in 1953 crumbled reinforced concrete used to support a series of walls of various types of construction.



At right, a battered window in a wood house, used in Civil Defense tests nine years ago, frames a scarred yucca at Yucca Flats. This house survived in salvageable condition; a similar one was completely demolished.



WHAT'S DOING

COMMUNITY CONCERT: Civic Auditorium, Thursday, February 6, Juilliard String Quartet.

FILM SOCIETY: Civic Auditorium, films shown 7 and 9 p.m. unless otherwise noted. Admission by \$3 season ticket or 90 cents single admission.

Wednesday, February 19, "Shoot the Piano Player." French comedy-drama, 85 minutes.

Wednesday, March 18, "Four Days of Naples." Italian drama, 124 minutes.

LITTLE THEATER: Civic Auditorium, 8:30 p.m. Friday and Saturday, March 13 and 14, "Great God Brown" by Eugene O'Neill.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leader for further information on specific hikes.

Sunday, February 16, Snowshoe hike, Lake Peak. Leader, Ken Ewing.

Saturday, February 29, Snowshoe hike. Leader, Roger Perkins.

LOS ALAMOS HIGH SCHOOL POOL: Winter schedule for public swimming. Adults 35 cents; students 15 cents.

Monday, 7 to 9 p.m. Open

Tuesday, 7 to 9 p.m. Adults

Saturday, 1 to 5 p.m. Open

Sunday, 1 to 5 p.m. Open

INTERNATIONAL FOLK DANCE CLUB: Open to the public. Meets the first Tuesday of each month, 8 p.m., Recreation Hall.

SWIMMING CLUB OF LOS ALAMOS, INC.: Membership open to adults interested in swimming. Club meets every Sunday, 7 to 9 p.m.

GREAT DECISIONS PROGRAM: International problems discussion, begins week of February 9. Contact John D. Rogers, 2-3243.

The Technical Side

Presented at the American Physical Society Meeting, New York City, January 22-25:

"The $B^{10}(\text{He}^3, n)\text{N}^{12}$ Reaction" by Chris Zafiratos of P-DOR; Fay Ajzenberg-Selove of Haverford College, and Frank S. Dietrich of California Institute of Technology.

"Intermediate Resonance Structures in Neutron Scattering" by James E. Young, T-DOT.

"Magnetic Probe Measurements on the Sheath Dynamics of a Coaxial Plasma Gun Device" by Joseph W. Mather of P-14 and Richard A. McCorkle, LASL Summer Graduate Student.

"Observation of the $\frac{1}{2}$ (411) Orbital in Ho^{165} " by Merle E. Bunker and John W. Starner, both of P-2, and Fred P. Cranston, LASL Summer Staff Member.

"Various Fluctuations in the C^{12} (C^{12}, α) Ne^{20} Cross Section" by Robert B. Leachman, P-12.

"Some Past and Present Uses of Nuclear-Explosion Sources in Research in Physics" by George A. Cowan, J-11.

"Creation of Heavy Nuclides With the Aid of Nuclear Explosions" by J. Carson Mark, T-DO.

"Time-of-Flight Measurements Made With Neutrons From Nuclear Explosions in Space" by Samuel J. Bame, P-4.

"Polarization in the Elastic Scattering of 10.7 MeV Protons by Complex Nuclei" by Jerome G. Beery, P-10 and Louis Rosen, P-DO.

"Energy Levels of Ho^{166} Excited by Thermal Neutron Capture" by Henry C. Motz and Edward T. Jurney, both of P-2.

"Angular Distribution of n-p Scattering at 23.5 MeV" by Wallace T. Leland, Edward R. Flynn and Jerome G. Beery, all of P-10.

American Physical Society Topical Conference on Semimetals, Columbia University, New York City, January 21:

"Phonon Dispersion Curves in Bismuth" by John L. Yarnell, John L. Warren, and Robert G. Wenzel, all of P-2; and S. H. Koenig of IBM Watson Laboratory.

American Chemical Society Meeting, Denver, Colorado, January 19-24:

"On the Theory of Unimolecular Reactions" by Don L. Bunker, CMF-4.

8th Conference of Industrial Hygiene and Air Pollution, University of Texas, Austin, January 25:

"The In-Plant Universe—Infinite Though Bounded" by Harry F. Schulte, H-5.

Seminar, University of Colorado Chemistry Department, Boulder, January 6:

"Intermediates in Aqueous Oxidation-Reduction Reactions" by Thomas W. Newton, CMF-2.

Colloquium for Staff and Students of the Meteorology Department, University of California, Los Angeles, January 13:

"Experimental Studies of Wakes and Jets Made with a Digital Computer" by Jacob E. Fromm, T-3.

Participation in a Panel Discussion during Symposium Week at Colorado College, Colorado Springs, January 13:

"Implications of Wartime Scientific Activities" by Louis Rosen, P-DO.

NEW HIRES

Following are LASL new hires:

Cary William Bequette, Los Alamos, P-11.

Martha Jean Thomas, Los Alamos, PER-1 (Casual).

Carrol Dean Maxwell, Carlsbad, N.M., M&R.

Floyd Henry Wimberley, Los Alamos, N-5.

James Lee Volz, Dayton, Ohio, N-3.

Robert Allen Tobey, Urbana, Illinois, H-4.

Paul Eugene Tate, Los Alamos, H-DO (Casual).

Everett E. Van Valkenburg, Moline, Illinois, CMB-7.

Benjamin E. Treece, Los Alamos, J-11 (Casual-Rehire).

Leroy Wilbur Tucker, Terre Haute, Indiana, K-4.

Ronald P. Schoonover, Aurora, Nebraska, N-5.



The kids call them "flying saucers," and when the round sled-like things get up enough speed, they actually do fly for a short distance. Trouble is, the landings often leave something to be desired. Pub photographer Bill Regan shot this picture but perhaps you've taken some unusual pictures

yourself. If so, The Atom would like to see them. Starting next issue, the best photograph submitted by one of our readers will be printed on this page. There will be no restriction on subject, but photographs should be eye-catching and interesting.



PHOTOGRAPHIC INTERPRETATION BY J. FREDERICK LAVAL

HARRY T. NOTZ
3187 Woodland
Los Alamos, New Mexico

CAPABILITY OF DETECTING CLANDESTINE NUCLEAR EXPLOSIONS IS THE AIM OF PROJECT VELA. LOS ALAMOS SCIENTIFIC LABORATORY IS DEVELOPING SENSITIVE DETECTION INSTRUMENTATION TO DISCRIMINATE BETWEEN NATURAL RADIATION PHENOMENA AND THOSE RESULTING FROM MAN-MADE DEVICES DETONATED IN SPACE.

*Qualified applicants interested in Vela and other vital programs at Los Alamos are invited to send resumes to:
Director of Personnel,
Division 63-103*



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